Risk factors for shunt dependency after aneurysmal subarachnoid hemorrhage

TO THE EDITOR: We read with great interest the article by Wilson et al.21 (Wilson CD, Safavi-Abbasi S, Sun H, et al: Meta-analysis and systematic review of risk factors for shunt dependency after aneurysmal subarachnoid hemorrhage. J Neurosurg [epub ahead of print April 1, 2016. DOI: 10.3171/2015.11.JNS152094]), in which a comprehensive meta-analysis had been conducted and several risk factors for shunt dependency in patients with aneurysmal subarachnoid hemorrhage (aSAH) were identified. Their findings were helpful for risk stratification in the assessment of patients with aSAH. However, some more issues should be addressed.

Firstly, the criteria for shunt dependency were not specified in this meta-analysis. According to the American Heart Association/American Stroke Association guidelines, chronic symptomatic hydrocephalus requires shunt placement.4 However, 2 of the studies8,16 included in the meta-analysis focused on risk factors associated with hydrocephalus instead of shunt dependency. Therefore, we believe that these studies should not be included. Secondly, 2 included studies focused on the aSAH patients with external ventricular drain (EVD) placement.2,3 Since some studies reported EVD placement as a risk factor for shunt dependency,18,19,23,24 we recommend performing a subgroup analysis (general patients group and EVD placement group). Thirdly, though the study from Lai and Mor-
gan had the largest population, the selection bias was not a negligible issue. Since the Australian National Hospital Morbidity Database was unable to track the data on aSAH patients beyond discharge from acute-care hospitals, data on patients with delayed or chronic hydrocephalus might not be captured. This bias may explain the reason that study reported the lowest shunt rate (6.5%) among all the included studies. Therefore, we recommend performing a sensitivity analysis by excluding that study to verify whether the results remain robust.

Fourthly, female sex did not reach statistical significance as a risk factor in this meta-analysis. However, according to the study inclusion criteria, some more studies should be considered eligible. When adding data from these studies, we detected a significantly increased risk of shunt dependency in female aSAH patients (Fig. 1; OR 1.28, 95% CI 1.12–1.46).

Fifthly, it was suggested that neurosurgical clipping might improve cerebrospinal fluid circulation and reduce the risk of shunt dependency by early evacuation of cisternal clot and blood products. However, Wilson et al. did not explore whether treatment modalities could influence the risk of shunt dependency.

**References**


